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EXAMINER
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ABOAGYE, MICHAEL

ART UNIT	PAPER NUMBER
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1793

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/533,177	<b>Applicant(s)</b> ILYUSHENKO ET AL.	
	<b>Examiner</b> MICHAEL ABOAGYE	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 9, 10, 12, 13, 15, 16 and 22-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9, 10, 12, 13, 15, 16 and 22-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 9, 10, 12, 13, 15-16 and 22-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forrest et al. (US Patent No. 6,398,883).

Regarding claims 9, 10, 22, 23 and 26, Forrest et al. discloses a method of welding together two metal work-pieces, the method including the following steps: providing two metal work-pieces machined from a block of an aluminum alloy to correspond to pre-selected shape and thickness (Forrest et al., column 3, lines 14-20 and lines 40-47). Forrest et al. teaches an embodiment (column 11, line 57-column 12, line 3) where the structural member includes external or internal defects which are mixed by friction stir welding tool to define a grain refined area and to relieve stresses due to casting the structural member. Forrest et al. also teaches a surface preparation step involving friction stir welding process that extending only part way into the work-piece from the exterior of (see, partial-penetration mixed regions designated "16" in the figures 1-2D, column 7, lines 15-17) resulting in grain structure refinement of the region extending from the exterior surface into the work-piece to a depth of about 6.5 mm (at

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least 10mm) and having grain structure finer than the grain structure of the work-piece outside that region (Forrest et al., column 3, lines 15-26, and abstract).

Based on this teaching one of ordinary skill in the art would have recognized the benefit of friction stirring to refine the surface of the structural member (51) to relieve casting stresses prior to the disclosed step of fusion welding the structural member (51) to the insert (51b) of the embodiment shown in Figures 14-15 (Forrest et al., column 5, lines 41-47, column 11, lines 30-56).

Forrest et al. also fails to expressly teach friction stir refining a region of the insert (51b) before aligning and fusion welding this insert to the structural member (51). However one of ordinary skill in the art would have appreciated the fact that said insert member can be the same material as the structural member (column 11, lines 37-38). It is therefore the examiner's position that it would have been obvious to one of ordinary skill in the art at the time of the invention to separately friction stir the structural member and the insert before aligning for fusion welding to eliminate any residual stresses that may exist on the surfaces prior to fusion welding them together since the success of achieving a weld joint of high integrity would have been reasonably predictable or expected and therefore it would have been obvious to one of ordinary skill in the art to try said practice. Furthermore, use of known technique to improve similar methods, in the same way. According to the Supreme Court, the teaching, suggestion, or motivation test (TSM test) is one of a number of valid rationales that could be used to determine obviousness. It is not the only rationale that may be relied upon to support a conclusion of obviousness. (*KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385 (2007)).

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Regarding the new limitation introduced into claim 9, it should be noted that Forrest et al. after the preparing step or friction stirring the surface of the work-piece (51), the insert (51b) is aligned and secured to the said workpiece (see, figures 14A-15).

Regarding the additional penetration limitations required in claims 10, 22, and 23, it should also be noted that fusion welding conducted in an already friction stir prepared surface would result in a penetration depth that would extends deeper into the work-piece deeper than welding the workpieces sole by fusion welding.

Forrest et al. also specifically in column 12, lines 4-18, teaches surface roughening or surface irregularities occurring on the surface of the locally refined or friction stirred portion of the workpiece and correcting said defect by milling to obtain the desired surface finish. (Note that said milling step means the same as the additional skimming step required in claim 22. This interpretation is supported by the fact that applicant in his specification [0011], teaches a skimming step to be performed by a milling machine). Said milling of Forrest et al. meets the limitation calling for machining step required in claim 26.

Regarding claims 24 and 25, Forest et al. discloses in figure 1, two structural members designated "11" having planar geometrical configuration and substantially flat surfaces. Forrest et al. includes a friction stir device with a probe or pin which travels through the structural work piece at a speed of about 127 mm – 720 mm per minute (5-30 inches per minute) depending on the thickness of the work pieces, said probe is capable of joining two structural work-pieces having joint depth greater than 50 mm

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(Forrest et al., abstract, figures 1, 2(A-D), 3(A-B), 16; column 1, line 10 – column 3, line 56 and column 5 line 30 – column 8, lines 5 –15).

Regarding claims 12, 13, 15, 16, 30 and 31 Forrest et al. teaches work-pieces machined from a block of metal and when welded together form at least part of a structural member suitable for manufacturing an aircraft component (Forrest et al., abstract, column 3, lines 45-47, column 11, lines 9-15; figures 1 and 16). Forrest et al. teaches components made of aluminum or aluminum alloys (Forrest et al., column 2, lines 5-11).

Regarding claims 28 and 29, Forrest et al. teaches an insert or a second workpiece made of either the same or dissimilar material from the first workpiece or structural member (see, column 11, lines 35-40). Forrest et al. also teaches work-pieces made of material including aluminum and alloys (Forrest et al., column 3, lines 14-20 and lines 40-47). Note, Forrest et al. teaches an embodiment (column 11, line 57- column 12, lines 3) where the structural member is produced by casting, hence where the insert member is made of the same material, one of ordinary skill in the art would appreciate the fact that said insert member could have been a casting member to ensure material compatibility.

3. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Forrest et al. (US Patent No. 6,398,883) as applied to claim 23 above and further in view of Bronson et al. (US Patent No. 5,720,824).

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Forrest et al. teaches the generalized fusion welding process by fail to teach electron beam welding.

However Bronson et al. teaches a method of welding a first member and a second member to form an aircraft component; wherein welding process is that of electron beam welding process; wherein said electron beam welding process is adapted due to it's easy penetration, narrow width of heat affected zone and consequent reduction in the propensity to distortion or deformation of the welded work-pieces (Bronson et al., column 1, lines 20-36).

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to modify the invention of Forrest et al. to use electron beam welding as taught by Bronson et al., since y the use of electron beam welding better penetration into the workpiece(s) can easily achieved while creating narrow width of heat affected zone and thereby reducing the distortion or deformation of the welded workpiece(s) (Bronson et al., column 1, lines 20-36).

### ***Response to Arguments***

4. The examiner acknowledges the applicants' amendment received by USPTO on July 21, 2008. Claims 9, 10,12,13,15, 16 and 22-31 remain under consideration in the application.

5. Applicant's arguments filed July 21, 2008 have been fully considered but they are not persuasive.

Applicant argues that the reliance on Forrest as a reference for joining work pieces together is misplaced. The text actually referred to by the Examiner only mentions as an aside that the "structural member can then be secured to other structural members to form the frame of an aircraft" [Col 3, lines 45-47]. Moreover, Applicant challenges the Examiners characterization that the "insert" teaches the steps of welding work pieces together. Forrest at Col 11, lines 26-56 describes that the insert is basically a liner for an aperture, that it is preferably made from a different material, that the insert is pressed or slip fit onto the work piece, and that the insert and work-piece are subjected to friction stir welding process after joining them together (emphasis added).

The examiner disagrees with the applicant characterization of the insert disclosed by Forrest et al. It should be noted that the examiner broadly interprets a workpiece as a member to be joined, welded or to be worked upon. It is noted the insert and the first workpiece are presented as two separate and distinct members or workpieces, hence said insert (51b) and said member (51) read on the claimed limitation calling for "two workpieces".

The examiner also disagrees with applicant that Forrest et al. only describes said insert being of a different material. It should be noted that Forrest et al. also teaches an insert made from the same material as the member, (see, column 11, lines 35-40).

The examiner agrees with applicant that the insert and work-piece are subjected to friction stir welding process after joining them together. Forrest et al. fails to expressly teach friction stir refining a region of the insert before aligning and fusion



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welding this insert to the structural member. However, Forrest et al. does teach an insert selected from the same material as the structural member. Therefore said insert may be a casting member as well, which means also susceptible to the same casting defects as the structural member. It is therefore the examiner's position that it would have been obvious to one of ordinary skill in the art at the time of the invention to friction stir separately both the structural member and the insert to refine their respective surfaces and eliminate any residual stresses that may exist on the surfaces prior to aligning and fusion welding them together since the success of achieving a weld joint of high integrity would have been reasonably predictable or expected and therefore it would have been obvious to one of ordinary skill in the art to try said practice.

Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a known technique to improve similar methods, in the same way.

According to the Supreme Court, the teaching, suggestion, or motivation test (TSM test) is one of a number of valid rationales that could be used to determine obviousness. It is not the only rationale that may be relied upon to support a conclusion of obviousness.

*(KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385 (2007)).*

Regarding the skimming step mentioned in the applicant's arguments, it should be noted that Forrest et al. specifically in column 12, lines 4-18, teaches surface roughening or surface irregularities occurring on the surface of the locally refined or friction stirred portion of the workpiece and correcting said defect by milling to obtain the desired surface finish. (i.e. noted Forrest et al. milling step is interpreted to mean the

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same as skimming, also applicant in his specification [0011] teaches skimming step to be performed by a milling machine).

The reference to Thomas has been withdrawn from this office action; hence any argument against said reference is moot.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL ABOAGYE whose telephone number is (571)272-8165. The examiner can normally be reached on Mon - Fri 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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